

**COMBINED TRANSMITTAL OF APPEAL BRIEF TO THE BOARD OF PATENT
APPEALS AND INTERFERENCES & PETITION FOR EXTENSION OF TIME
UNDER 37 C.F.R. 1.136(a) (Large Entity)**

Docket No.
0EKM-104792

In Re Application Of: **HYUN JIN KIM, et al.**

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
10/662,619	September 15, 2003	Raeann Gordon	30764	3711	9762

Invention:

GOLF BALLS INCORPORATING PEPTIZERS AND METHOD OF MANUFACTURE

COMMISSIONER FOR PATENTS:

This is a combined Transmittal of Appeal Brief to the Board of Patent Appeals and Interferences and petition under the provisions of 37 CFR 1.136(a) to extend the period for filing an Appeal Brief.

Applicant(s) hereby request(s) an extension of time of (check desired time period):

☒ One month ☐ Two months ☐ Three months ☐ Four months ☐ Five months

from: November 8, 2008 until: December 8, 2008
Date *Date*

The fee for the Appeal Brief and Extension of Time has been calculated as shown below:

Fee for Appeal Brief: \$540.00

Fee for Extension of Time: \$130.00

TOTAL FEE FOR APPEAL BRIEF AND EXTENSION OF TIME: **\$670.00**

The fee for the Appeal Brief and extension of time is to be paid as follows:

- ☐ A check in the amount of _____ for the Appeal Brief and extension of time is enclosed.
- ☒ Please charge Deposit Account No. **19-1853** in the amount of **\$670.00**
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In Re Application Of: **HYUN JIN KIM, et al.**

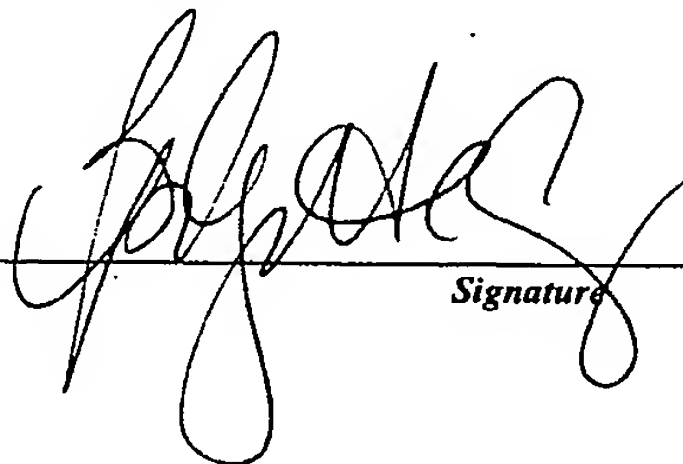
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10/662,619	September 15, 2003	Raeann Gordon	30764	3711	9762

Invention:

GOLF BALLS INCORPORATING PEPTIZERS AND METHOD OF MANUFACTURE

TO THE COMMISSIONER FOR PATENTS:

This combined Transmittal of Appeal Brief to the Board of Patent Appeals and Interferences and petition for extension of time under 37 CFR 1.136(a) is respectfully submitted by the undersigned:


Signature

Dated: **November 14, 2008**

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cc:

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.:	10/662,619	Confirmation No.:	9762
Applicant:	Kim et al.		
Filed:	September 15, 2003		
Title:	GOLF BALL INCORPORATING PEPTIZERS AND METHOD OF MANUFACTURE		
Examiner:	Raeann Trimiew		
Art Unit:	3711		
Docket No.:	0EKM-104792		
Customer No.:	30764		
Date:	November 14, 2008		

APPELLANTS' APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

(1) REAL PARTY IN INTEREST

The real party in interest in this application is the only assignee, Taylor Made Golf Company, Inc.

(2) RELATED APPEALS AND INTERFERENCES

Appellants previously filed a Notice of Appeal and Appeal Brief dated January 25, 2007 for the above-identified application. Subsequent to filing the Appeal Brief, the Examiner issued an Office Action dated June 4, 2007 withdrawing the finality of the February 10, 2006 Office Action, which mooted the Appeal. No actions were taken on the Appeal.

(3) **STATUS OF CLAIMS**

Claims 1-41, 48, 50-53, 55-57, 63, and 64 are pending in the application and have been finally rejected by the Examiner. Claims 42-47, 49, 54, and 58-62 were canceled. Appellants have appealed the rejection of claims 1-41, 48, 50-53, 55-57, 63, and 64.

(4) **STATUS OF AMENDMENTS**

Appellants have not filed an amendment after final rejection. All amendments filed by Appellants have been entered by the Examiner.

(5) **SUMMARY OF CLAIMED SUBJECT MATTER**

Independent Claim 1

Independent claim 1 is directed to a golf ball incorporating a composition comprising an unsaturated polymer, a cross-linking agent comprising a peroxide, a peptizer including a non-metal salt of an organic sulfur compound; and an accelerator. Support for this claim is found in paragraphs [0020] and [0030] of the specification.

Independent Claim 25

Independent claim 25 is directed to a golf ball including a composition comprising an unsaturated polymer, a cross-linking agent comprising a peroxide, a peptizer including a non-metal salt of an organic sulfur compound, and an accelerator. Specifically, the composition includes from about 0.2 part to about 3 parts by weight of the cross-linking agent per 100 parts by weight of the unsaturated polymer, greater than about 0.5 part by weight of the peptizer per 100 parts by weight of the unsaturated polymer, and from about 0.2 part to about 5 parts by weight of the accelerator per 100 parts by weight of the unsaturated polymer. Support for this claim is found in paragraphs [0020], [0028], and [0030] of the specification.

Independent Claim 41

Independent claim 41 is directed to a method for manufacturing a golf ball, including the following steps: (1) providing an unsaturated polymer, a cross-linking agent

comprising a peroxide, a peptizer including a non-metal salt of an organic sulfur compound, and an accelerator; (2) preparing a composition from the unsaturated polymer, the cross-linking agent, the peptizer, and the accelerator; and (3) forming the composition into the golf ball. Support for this claim is found in paragraphs [0020], [0030], [0031], [0039], and [0040] of the specification.

(6) **GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

- A. Whether claims 1-22, 24-38, 40, 41, 48, 51, 53, 56, 57, 63 and 64 are unpatentable under 35 U.S.C. § 103(a) over U.S. Publication No. 2001/0031669 to Ohama (the “Ohama publication”).
- B. Whether claims 23 and 39 are unpatentable under 35 U.S.C. § 103(a) over the Ohama publication, in view of U.S. Publication No. 2001/0000506 to Sullivan (the “Sullivan publication”).

(7) **ARGUMENT**

B. **Rejection of Claims 1-22, 24-38, 40, 41, 48, 51, 53, 56, 57, 63, and 64 under 35 U.S.C. § 103(a) over the Ohama publication**

On pages 2-4 of the Final Office Action, claims 1-22, 24-38, 40, 41, 48, 51, 53, 56, 57, 63 and 64 were finally rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over the Ohama publication.

In her comments supporting the rejection of independent claims 1, 25, and 41, the Examiner asserted that the Ohama publication discloses all of features recited in these claims, including the use of pentachlorothiophenol (an organic sulfur compound) as a peptizer. The Examiner admitted that the Ohama publication only broadly discloses the use of pentachlorothiophenols, and does not disclose specific types such as metal salts or nonmetal salts. However, the Examiner stated that for purposes of the invention, the metal salts and nonmetal salts appear to be equivalents. The Examiner further states that one of ordinary skill in the art would substitute the non-metal sales for the metal salts since both appear to have the same function. The Examiner requested Applicants to provide scientific data showing the

difference(s) between the golf balls comprising the metal salts versus golf balls comprising nonmetal salts, i.e. examples. Applicants respectfully disagree with the Examiner's assertions

As admitted by the Examiner, the Ohama publication fails to disclose the use of a peptizer including a non-metal salt of an organic sulfur compound. Additionally, contrary to the Examiner's assertions, metal salts and nonmetal salts are not equivalents for purposes of this invention for two main reasons.

First, it is well known that a non-metal salt of pentachlorothiophenols ("PCTP"), such as $\text{NH}_4^+(\text{PCTP})$, typically has a much lower melting point than the corresponding metal salt of PCTP, such as $\text{Zn}(\text{PCTP})_2$. (Declaration of Hyun Jin Kim Under 37 C.F.R. § 1.132 ("Kim Decl."), ¶ 15.) In fact, the melting point of $\text{NH}_4^+(\text{PCTP})$ is $175\sim 180^\circ\text{C}$, whereas $\text{Zn}(\text{PCTP})_2$ has been shown not to melt (but rather decomposes) at temperatures above 250°C . (*Id.*) Because the melting point of a non-metal salt of PCTP is close to the temperature at which curing takes place, the non-metal salts of PCTP, such as $\text{NH}_4^+(\text{PCTP})$, will melt during the cure process, whereas metal salts of PCTP, such as $\text{Zn}(\text{PCTP})_2$, remain in a powder state during the cure process. (*Id.*, ¶ 16.) It is known that mixing a molten chemical with a rubber compound occurs much more efficiently than with a powder, and rubber compounded with a non-metal salt (such as $\text{NH}_4^+(\text{PCTP})$) has a lower compound Mooney viscosity than a corresponding rubber formulated with an identical amount of a metal salt (such as $\text{Zn}(\text{PCTP})_2$). (*Id.*, ¶ 17.)

The improved mixing efficiency for non-metal salts results in lower compound viscosity and, thus, facilitates the mixing of all the components of the rubber formulation, including those of the crosslinking agent and any co-crosslinking agent and core specific gravity adjusters such as zinc salts (including zinc oxide). (Kim Decl., ¶ 18.) This in turn allows greater flexibility in designing the components of a rubber formulation both in terms of the compounds included and their relative amounts. (*Id.*) This in turn allows additional control and optimization of important golf ball properties such core/ball weight, core/ball compression, core/ball COR and core/ball impact durability. (*Id.*)

Second, the reaction byproduct of a $\text{Zn}(\text{PCTP})_2$ in the curing process is in the form of a Zn-salt. (Kim Decl., ¶ 19.) Metal salts such as zinc oxide are used in the core rubber formulations to adjust the core specific gravity in order to change the performance of the ball.

(*Id.*) In contrast, non-metal salts of PCTP do not have such metal salt by-products which adjust the specific gravity of a golf ball. Therefore, the use of non-metal salts of PCTP does not result in the creation of reaction byproducts that affect the performance of golf balls. (*Id.*)

For these reasons, the use of nonmetal salts of thiophenols and metal salts of thiophenols are not equivalents or interchangeable. Therefore, the § 103(a) rejection of independent claims 1, 25, and 41 is improper and should be withdrawn.

Claims 2-22, 24, 48, and 50-52 all depend from independent claim 1, and claims 26-38, 40, 53, 55-57, 63, and 64 depend from independent claim 25. These dependent claims all add features that more particularly define the invention and thus further distinguish over the cited Ohama publication. These dependent claims, likewise, should be allowed.

B. Rejection of Claims 23 and 39 under 35 U.S.C. § 103(a) over the Ohama publication in view of the Sullivan publication

On page 4 of the Final Office Action, dependent claims 23 and 39 were finally rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over the Ohama publication in view of the Sullivan publication.

In her comments supporting the rejection of dependent claims 23 and 39, the Examiner asserted that the Ohama publication discloses the invention, but does not disclose a wound layer. The Examiner further states that the Sullivan publication teaches a golf ball comprising a solid or wound layer over the core, and that one of ordinary skill in the art would include the wound layer for lower manufacturing costs.

Applicants respectfully disagree. As discussed above, the Ohama publication fails to disclose the use of a peptizer including a non-metal salt of an organic sulfur compound. Additionally, contrary to the Examiner's assertions, metal salts and nonmetal salts are not equivalents for purposes of this invention for two main reasons. Therefore, the cited references fail to disclose all of the limitations recited in independent claims 1 and 25. Thus, the § 103(a) rejection of independent claims 1 and 25 is improper and should be withdrawn.

Claim 23 depends from independent claim 1, and claim 39 depends from independent claim 25. These dependent claims add features that more particularly define the invention and, thus, further distinguish over the Ohama and Sullivan publications. These dependent claims, likewise, should be allowed.

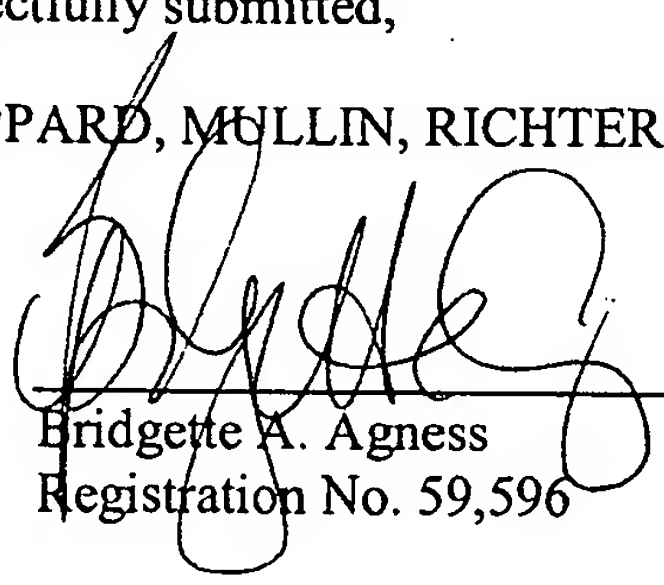
D. Conclusion

For the reasons set forth above, the rejections of the claims are improper and should be reversed. A decision directing the Examiner to issue a Notice of Allowance is respectfully requested.

Respectfully submitted,

SHEPPARD, MULLIN, RICHTER & HAMPTON LLP

By:


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(8) **CLAIMS APPENDIX**

Claim 1: A golf ball including a composition comprising:

an unsaturated polymer;
a cross-linking agent comprising a peroxide;
a peptizer including a non-metal salt of an organic sulfur compound; and
an accelerator.

Claim 2: The golf ball according to claim 1, wherein the composition includes greater than about 0.1 part by weight of the peptizer per 100 parts by weight of the unsaturated polymer.

Claim 3: The golf ball according to claim 1, wherein the composition includes greater than about 0.5 part by weight of the peptizer per 100 parts by weight of the unsaturated polymer.

Claim 4: The golf ball according to claim 1, wherein the composition includes greater than about 2.5 parts by weight of the peptizer per 100 parts by weight of the unsaturated polymer.

Claim 5: The golf ball according to claim 1, wherein the peptizer includes a non-metal salt of pentachlorothiophenol.

Claim 6: The golf ball according to claim 1, wherein the composition includes from about 0.1 part to about 10 parts by weight of the accelerator per 100 parts by weight of the unsaturated polymer.

Claim 7: The golf ball according to claim 1, wherein the composition includes from about 0.2 part to about 5 parts by weight of the accelerator per 100 parts by weight of the unsaturated polymer.

Claim 8: The golf ball according to claim 1, wherein the composition includes from about 0.5 part to about 1.5 parts by weight of the accelerator per 100 parts by weight of the unsaturated polymer.

Claim 9: The golf ball according to claim 1, wherein the accelerator is selected from the group consisting of 2-mercaptobenzothiazole and a salt of 2-mercaptobenzothiazole.

Claim 10: The golf ball according to claim 1, wherein the composition includes from about 0.05 part to about 5 parts by weight of the cross-linking agent per 100 parts by weight of the unsaturated polymer.

Claim 11: The golf ball according to claim 1, wherein the composition includes from about 0.2 part to about 3 parts by weight of the cross-linking agent per 100 parts by weight of the unsaturated polymer.

Claim 12: The golf ball according to claim 1, wherein the composition includes from about 0.5 part to about 1.5 parts by weight of the cross-linking agent per 100 parts by weight of the unsaturated polymer.

Claim 13: The golf ball according to claim 1, wherein the unsaturated polymer is selected from the group consisting of 1,2-polybutadiene, cis-1,4-polybutadiene, trans-1,4-polybutadiene, cis-polyisoprene, trans-polyisoprene, polychloroprene, polybutylene, styrene-butadiene rubber, block copolymer of styrene and butadiene, block copolymer of styrene and isoprene, nitrile rubber, silicone rubber, polyurethane, and mixtures thereof.

Claim 14: The golf ball according to claim 1, wherein the composition further comprises one or more ingredients selected from the group consisting of UV stabilizers, photo stabilizers, antioxidants, colorants, dispersants, mold releasing agents, processing aids, and fillers.

Claim 15: The golf ball according to claim 14, wherein the one or more ingredients include a filler that adjusts a density of the composition.

Claim 16: The golf ball according to claim 14, wherein the one or more ingredients include a filler selected from the group consisting of zinc oxide, tungsten, and barium sulfate.

Claim 17: The golf ball according to claim 14, wherein the one or more ingredients include a filler and the composition includes from about 10 parts to about 80 parts by weight of the filler per 100 parts by weight of the unsaturated polymer.

Claim 18: The golf ball according to claim 1, wherein the composition further comprises a compound selected from the group consisting of an unsaturated carboxylic acid, a metal salt of the unsaturated carboxylic acid, and mixtures thereof.

Claim 19: The golf ball according to claim 18, wherein the composition includes from about 20 parts to about 60 parts by weight of the compound per 100 parts by weight of the unsaturated polymer.

Claim 20: The golf ball according to claim 1, further comprising:

- a core; and

- a cover layer over the core;

- wherein at least one of the core and the cover layer includes the composition.

Claim 21: The golf ball according to claim 20, wherein the core includes:

- an inner core; and

- an outer core encasing the inner core.

Claim 22: The golf ball according to claim 20, wherein the core includes a material in liquid form.

Claim 23: The golf ball according to claim 20, further comprising a layer of rubber thread located between the core and the cover layer.

Claim 24: The golf ball according to claim 1, further comprising:

- a core;

- at least one intermediate layer over the core; and

- a cover layer over the outermost intermediate layer;

wherein at least one of the core, the at least one intermediate layer, and the cover layer includes the composition.

Claim 25: A golf ball including a composition comprising:

an unsaturated polymer;

a cross-linking agent comprising a peroxide;

a peptizer including a non-metal salt of an organic sulfur compound; and

an accelerator;

wherein the composition includes:

from about 0.2 part to about 3 parts by weight of the cross-linking agent per 100 parts by weight of the unsaturated polymer,

greater than about 0.5 part by weight of the peptizer per 100 parts by weight of the unsaturated polymer, and

from about 0.2 part to about 5 parts by weight of the accelerator per 100 parts by weight of the unsaturated polymer.

Claim 26: The golf ball according to claim 25, wherein the composition includes greater than about 2.5 parts by weight of the peptizer per 100 parts by weight of the unsaturated polymer.

Claim 27: The golf ball according to claim 25, wherein the peptizer includes a non-metal salt of pentachlorothiophenol.

Claim 28: The golf ball according to claim 25, wherein the accelerator is selected from the group consisting of 2-mercaptobenzothiazole and a salt of 2-mercaptobenzothiazole.

Claim 29: The golf ball according to claim 25, wherein the unsaturated polymer is selected from the group consisting of 1,2-polybutadiene, cis-1,4-polybutadiene, trans-1,4-polybutadiene, cis-polyisoprene, trans-polyisoprene, polychloroprene, polybutylene, styrene-butadiene rubber, block copolymer of styrene and butadiene, block copolymer of styrene and isoprene, nitrile rubber, silicone rubber, polyurethane, and mixtures thereof.

Claim 30: The golf ball according to claim 25, wherein the composition further comprises one or more ingredients selected from the group consisting of UV stabilizers, photo stabilizers, antioxidants, colorants, dispersants, mold releasing agents, processing aids, and fillers.

Claim 31: The golf ball according to claim 30, wherein the one or more ingredients include a filler that adjusts a density of the composition.

Claim 32: The golf ball according to claim 30, wherein the one or more ingredients include a filler selected from the group consisting of zinc oxide, tungsten, and barium sulfate.

Claim 33: The golf ball according to claim 30, wherein the one or more ingredients include a filler and the composition includes from about 10 parts to about 80 parts by weight of the filler per 100 parts by weight of the unsaturated polymer.

Claim 34: The golf ball according to claim 25, wherein composition further comprises a compound selected from the group consisting of an unsaturated carboxylic acid, a metal salt of the unsaturated carboxylic acid, and mixtures thereof.

Claim 35: The golf ball according to claim 34, wherein the composition includes from about 20 parts to about 60 parts by weight of the compound per 100 parts by weight of the unsaturated polymer.

Claim 36: The golf ball according to claim 25, further comprising:

- a core; and

- a cover layer over the core;

- wherein at least one of the core or cover layer includes the composition.

Claim 37: The golf ball according to claim 36, wherein the core includes:

- an inner core; and

- an outer core encasing the inner core.

Claim 38: The golf ball according to claim 36, wherein the core includes a material in liquid form.

Claim 39: The golf ball according to claim 36, further comprising a layer of rubber thread located between the core and the cover layer.

Claim 40: The golf ball according to claim 25, further comprising:

- a core;

- at least one intermediate layer over the core; and

- a cover layer over the outermost intermediate layer;

wherein at least one of the core, the at least one intermediate layer, and the cover layer includes the composition.

Claim 41: A method for manufacturing a golf ball, the method comprising:

- providing:

 - an unsaturated polymer,

 - a cross-linking agent comprising a peroxide,

 - a peptizer including a non-metal salt of an organic sulfur compound, and

 - an accelerator;

- preparing a composition from the unsaturated polymer, the cross-linking agent, the peptizer, and the accelerator; and

- forming the composition into the golf ball.

Claim 48: The golf ball according to claim 1, and further comprising a co-cross-linking agent that is a metal salt of an unsaturated carboxylic acid.

Claim 50: The golf ball according to claim 1, wherein the peptizer is selected from the group consisting of an amine salt of pentachlorothiophenol, an ammonium salt of pentachlorothiophenol, and mixtures thereof.

Claim 51: The golf ball according to claim 1, wherein the cross-linking agent is selected from the group consisting of diacetyl peroxide; di-tert-butyl peroxide; dibenzoyl peroxide; dicumyl

peroxide; 2,5-dimethyl-2,5-di(benzoylperoxy)hexane; 1,4-bis-(t-butylperoxyisopropyl-)benzene, t-butylperoxybenzoate; 2,5-dimethyl-2,5-di-(t-butylperoxy)hexyne-3; 1,1-bis(t-butylperoxy)-3,3,5 tri-methylcyclohexane; and di-(2,4-dichlorobenzoyl)peroxide.

Claim 52: The golf ball according to claim 51, wherein the cross-linking agent 2,5-dimethyl-2,5-di-(t-butylperoxy)hexyne-3.

Claim 53: The golf ball according to claim 25, and further comprising a co-cross-linking agent that is a metal salt of an unsaturated carboxylic acid.

Claim 55: The golf ball according to claim 25, wherein the peptizer is selected from the group consisting of an amine salt of pentachlorothiophenol, an ammonium salt of pentachlorothiophenol, and mixtures thereof.

Claim 56: The golf ball according to claim 25, wherein the cross-linking agent is selected from the group consisting of diacetyl peroxide; di-tert-butyl peroxide; dibenzoyl peroxide; dicumyl peroxide; 2,5-dimethyl-2,5-di(benzoylperoxy)hexane; 1,4-bis-(t-butylperoxyisopropyl-)benzene, t-butylperoxybenzoate; 2,5-dimethyl-2,5-di-(t-butylperoxy)hexyne-3; 1,1-bis(t-butylperoxy)-3,3,5 tri-methylcyclohexane; and di-(2,4-dichlorobenzoyl)peroxide.

Claim 57: The golf ball according to claim 56, wherein the cross-linking agent includes 2,5-dimethyl-2,5-di-(t-butylperoxy)hexyne-3.

Claim 63: The golf ball according to claim 51, wherein the cross-linking agent includes 1,1-bis(t-butylperoxy)-3,3,5 tri-methylcyclohexane.

Claim 64: The golf ball according to claim 56, wherein the cross-linking agent includes 1,1-bis(t-butylperoxy)-3,3,5 tri-methylcyclohexane.

(9) **EVIDENCE APPENDIX**

A declaration under 37 C.F.R. § 1.132 by Hyun Jin Kim was submitted in connection with a Response filed on December 4, 2007. The 1.132 declaration provided scientific data showing why metal salts and nonmetal salts are not equivalents for purposes of the claimed invention.

On pages 4-5 of the March 6, 2008 Office Action, the Examiner responded to and dismissed Applicants' arguments regarding the difference between using metal salts versus non-metal salts.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 10/662,619 Confirmation No.: 9762
Applicant: Hyun Jin Kim et al.
Filed: September 15, 2003
Title: GOLF BALLS INCORPORATING PEPTIZERS
AND METHOD OF MANUFACTURE

Examiner: Raeann Trimiew
Art Unit: 3711

Docket No.: 0EKM-104792
Date: December 4, 2007

Customer No.: 30764

DECLARATION OF HYUN JIN KIM UNDER 37 C.F.R. § 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Hyun Jin Kim, residing in Carlsbad, California, declare as follows:

- 1) I am one of the named inventors of the invention described and claimed in the above-identified patent application.
- 2) I graduated from Aju University, Korea in February, 1984 with a BS degree in Chemical Engineering.
- 3) I attended graduate school at Hanyang University from March 1984 to August, 1986 graduating with a MS degree in Industrial Materials Science and Engineering.
- 4) I was employed by GE Plastics Co. from July 1988 to June 1992 as an Engineer and Materials Specialist initially in Seoul, Korea and then Evansville, Illinois.

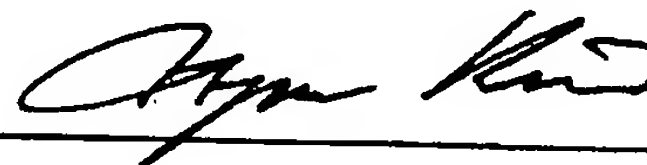
- 5) I attended graduate school at Case Western Reserve University from 1993 to 1997, graduating with a PhD in Science and Engineering in May, 1997.
- 6) I have worked for TaylorMade-adidas Golf Company from June 1997 to the present and I am currently Research Manager of the golf ball development group.
- 7) As a result of my education and work history, I have over 15 years experience in the field of polymer science and I am familiar with the structures, properties and analysis of high polymers, particularly rubbers, elastomers and other polymers used for golf ball development.
- 8) I am also familiar with the viscosities of polymers, methods for measuring these properties, and mathematical relationships that exist between these properties.
- 9) I submit this declaration in connection with the above-identified application to provide scientific data showing the difference between golf balls comprising metal salts of thiophenols versus golf balls comprising non-metal salts of thiophenols.
- 10) A metal salt of pentachlorothiophenol ("PCTP") is bis(pentachlorothiophenol)-zinc, hereinafter " Zn-(PCTP)_2 ".
- 11) A non-metal salt of pentachlorothiophenol ("PCTP") is ammonium pentachlorothiophenol, hereinafter " $\text{NH}_4^+ \text{-(PCTP)}$ ".
- 12) Both Zn-(PCTP)_2 and $\text{NH}_4^+ \text{-(PCTP)}$ are examples of peptizers which are used in conjunction with a base rubber and a crosslinking (curing) agent which when compounded and reacted together make a compounded rubber useful as a component of a golf ball.
- 13) By varying the amount of peptizer in the rubber formulation to be compounded and cured, it is possible to change the properties of the cores of such golf ball components including the golf ball core and/or golf ball coefficient of restitution ("COR").
- 14) Typically peptizers are introduced into the rubber formulation by compounding with the base rubber as a powder dispersion initially and the compound is then sufficiently heated in the molding process to a temperature at which the crosslinking reaction occurs between the base rubber and the crosslinking agent, also known as the curing process.

- 15) It is well known that a non-metal salt of PCTP, such as $\text{NH}_4^+(\text{PCTP})$ would typically have a much lower melting point than the corresponding metal salts such as $\text{Zn}(\text{PCTP})_2$. In fact the melting point of $\text{NH}_4^+(\text{PCTP})$ is $175\sim 180^\circ\text{C}$, whereas $\text{Zn}(\text{PCTP})_2$ has been shown not to melt (but rather decomposes) at temperatures above 250°C .
- 16) As the melting point of a non-metal salt of PCTP is close to the temperature at which curing takes place, the non-metal salts of PCTP, such as $\text{NH}_4^+(\text{PCTP})$, will melt during the cure process, whereas metal salts of PCTP, such as $\text{Zn}(\text{PCTP})_2$, remain in a powder state during the cure process.
- 17) It is known that mixing a molten chemical with a rubber compound occurs much more efficiently than with a powder, and rubber compounded with $\text{NH}_4^+(\text{PCTP})$ has a compound Mooney viscosity of only 34 versus a value of 39 for the corresponding rubber formulated with an identical amount of as $\text{Zn}(\text{PCTP})_2$.
- 18) The improved mixing efficiency for the non-metal salts thus results in lower compound viscosity and thus facilitates the mixing of all the components of the rubber formulation including those of the crosslinking agent and any co-crosslinking agent and core specific gravity adjusters such as zinc salts including zinc oxide. This in turn allows greater flexibility in designing the components of a rubber formulation both in terms of the compounds included and their relative amounts. This in turn allows additional control and optimization of important golf ball properties such core/ball weight, core/ball compression, core/ball COR and core/ball impact durability.
- 19) Additionally, the reaction byproduct of a $\text{Zn}(\text{PCTP})_2$ in the curing process is in the form of a Zn-salt. As stated above, metal salts such as zinc oxide are used in the core rubber formulations to adjust the core specific gravity in order to change the performance of the ball. In contrast, non-metal salts of PCTP do not have such metal salt by-products which adjust the specific gravity of a golf ball.

All statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true, and further these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: December 4, 2007

By: _____



Hyun Jin Kim

(10) **RELATED PROCEEDINGS APPENDIX**

None.